Lat 41.69019 Lon -122.77676

United States Department Of Agriculture | Forest Service | Shasta-Trinity National Forests
2400 Washington Avenue
Redding, CA 96001

Reply To: 3420 Date: December 2, 1992

Subject: Evaluation of White Fir Mortality, Scott River RD, Klamath NF (FPM Rept. No. N92-8).

To: Forest Supervisor, Klamath NF.

Scott River RD personnel noticed a large amount of white fir mortality in T. 44 N., R. 8 W., S. 4. The area is northeast of the Deadwood Conservation Camp. The parcel consists of about 400 acres of NFS land in an area of checkerboard ownership. The reason for concern is that the stand was considered suitable habitat for the Northern Spotted Owl.

The area was visited on July 30, 1992 by Dave Schultz, Gregg DeNitto, and Linda Haugen from the Forest Pest Management Northern California Service Area, Hoop George and Bernie Halterman from the District, and Wildlife Biologist Debbie DesLaurier. The stand was largely comprised of white fir, with small amounts of incense-cedar and sugar pine. It appeared to be a mature second-growth stand with some obvious pre-dominant trees. There were some rock outcrops which were non-stocked, or had sparse (S) crown closure. Crown closure in the remainder of the stand prior to mortality was medium (N) or heavy (G).

An overview of the area was obtained from two separate rock outcrops. Most of the dead, dying, thin, and off-color trees in the area were white firs. A progression of crown conditions in the dead trees indicated that white fir mortality has been building in the area for several years. The underlying factor responsible for the mortality was several consecutive years of drought, which added to the moisture stress on a heavily stocked stand. The immediate cause of the white fir mortality was attacks by the fir engraver, Scolytus ventralis, which carries the brown-staining fungus, Trichosporium symbioticum. The fir roundheaded borer, Tetropium abietis, was also present in the thick-barked portions of some trees.

Both the fir engraver, and fir roundheaded borer have a one-year life cycle in the area examined. There is no obvious early sign of infestation by the fir roundheaded borer. Attacks by the fir engraver, particularly in drought-stressed trees, causes considerable amounts of light colored boring dust to accumulate in bark crevices. Numerous white fir trees under current attack by fir engraver were evident in the area examined on July 30. Bark samples were removed from several trees to confirm that Scolytus ventralis and Trichosporium symbioticum were present. A few of the attacked trees may begin to fade this fall, but most will turn color during the spring of 1993.

The District has taken data on the condition of trees at sample points in the stand. During the late summer of 1992, 19 percent of the trees in the stand were dead (totally discolored foliage), and an additional 51 percent of the trees were under fatal attack by the fir engraver (boring dust in bark crevices). Only 30 percent of the trees in the stand will be alive by 1993. Because the mortality tends to have a clustered distribution, there will be some spots which will be either non-stocked, or sparse (S) stocking, while other areas have light (P) stocking.

Removal of the dead white fir trees will not reduce the amount of future mortality. To the contrary, the amount of disturbance, damage, and sudden exposure caused by salvage logging can actually result in additional mortality. The amount of stand disturbance can be reduced by following procedures developed by the Silvicultural Development Unit for harvesting in true fir stands, and also by minimizing the number of stand entries. The major benefits of salvage logging would be to recover some of the value of the dead trees, and also to remove some of the fuel from the site.

Most of the white fir trees which will fade during 1993 were attacked by beetles during the summer of 1992. Some deterioration of the wood by insects and fungi will begin during the fall of 1992. Deterioration will be slow during the winter, and increase as temperatures warm during the spring and summer. The trees will have been dead for one complete year by September 1993. The length of time which trees retain some commercial economic value depends on the diameter of the trees, and also on the type of product for which they are harvested. The table below lists the minimum size diameter white fir trees which will retain a core of sawlog quality wood for varying lengths of time. Trees can be harvested for chips for longer periods than those listed for sawlogs. One of the limiting factors in the length of time that trees are suitable for chip material is that dead trees tend to deteriorate most rapidly at the base. Trees which still contain some sound wood may break off near the ground line. If the fallen trees require any additional investment of labor or equipment, it may make it uneconomical to recover them.

MINIMUM DBH OF WHITE FIR SALVABLE FOR SAWLOGS
(minimum 6 inch sound core)

| YEARS AFTER DEATH | Minimum 25 Percent Gross Board Foot Volume | Minimum 33 Percent Gross Board Foot Volume |
|---|---|---|
| 1 | 10+ inches | 10+ inches |
| 2 | 22 | 26 |
| 3 | 26 | 34 |
| 4 | 38 | N/A |
| 5 | N/A | |

White fir mortality in drought-stressed stands generally remains high until a year or two after precipitation returns to normal. Mortality in this stand may

decline by 1994 due to depletion of suitable host trees. There will be some unstocked areas in the stand. Any salvage logging is likely to expose enough mineral soil to result in the natural establishment of white fir seedlings. White fir would probably be a minor component of a relatively open stand on this site if the stand was maintained by light fires on a natural fire frequency. A more stable replacement stand can be created by planting some of the tree species characteristic of earlier seral stages, such as ponderosa pine and Douglas-fir. Sugar pine and incense-cedar are also native on this site as minor components. This site lies in the 30 to 40 inch annual average precipitation band. It is likely to experience at least one severe drought during the lifespan of every stand. Any stand on this site which has more than about 200 square feet of basal area during a period of severe drought is likely to experience heavy mortality. Some form of recurring basal area reduction would be necessary to avoid episodes of heavy mortality.

If you need more information, please contact Dave Schultz at (916) 246-5087.

/s/David E. Schultz
David E. Schultz
Entomologist
FPM Northern CA Service Area